

REMARKS

This Response to the Office Action mailed October 13, 2009, is believed to address each and every issue raised in the Action. A favorable reconsideration of the application is respectfully requested. Claims 1, 3-6, 10-14 are all the claims pending in the application.

Response to Claim Rejections under 35 U.S.C. § 103

On page 2 of the Action, claims 1, 3, 5, 6, and 9-14 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Ueda (JP 59-196338) and further in view of Imamura (US 3,913,652) and Scriver (US 4,192,366).

On page 4 of the Action, claim 7 is rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Ueda, Scriver, and Imamura as applied in claim 1 above and further in view of Inui (US 5,191,003).

On page 4 of the Action, claims 1, 3-6 and 10-14 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Segatta (US 5,396,940) and further in view of Imamura and Scriver.

Applicants respectfully traverse. None of the combinations of cited references disclose or render obvious all the features of the presently claimed invention.

Present claim 1 is characterized in that (A) the synthetic polyisoprene rubber has a 3,4-bond content of not more than 0.5%. When the 3,4-bond content of the polyisoprene rubber exceeds 0.5%, the extension crystallinity is harmed and the dynamic properties, e.g., durability, are deteriorated. (See paragraph [0015] of the specification). This unexpectedly superior result is not taught or even suggested by any of the cited references.

In combination with the above, Applicants submit herewith an additional Declaration under Rule 132 demonstrating the unexpectedly superior results obtained by the present invention.

As is clear from the evidence in the Declaration, when the 3,4-bond content of the polyisoprene rubber exceeds 0.5%, the durability of the rubber composition is notably deteriorated, even when the cis-1,4-bond content of the polyisoprene rubber is more than 99.0%.

Thus, it is apparent that the present invention is unexpectedly superior and Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. § 103 rejections.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: January 13, 2010

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of Biju SUZUKI, et al.

Application No.: 10/562,947

Filed: December 30, 2005

For: RUBBER COMPOSITION AND TIRE USING THE SAME

Group Art Unit: 1791

Examiner: Justin R. Fischer

Confirmation No.: 8599

DECLARATION UNDER 37 C.F.R. § 1.132

I, Biju Suzuki, declare that:

I am one of the inventors of the above-captioned patent application.

I received my Master of Science and Technology from Keio University in 2002, and have been employed by Bridgestone Corporation since 2002, where I have been engaged mainly in research and development of new polymers.

I have made the following experiments in order to evaluate the processability, the wear resistance and the durability of the rubber composition comprising as a rubber component (A) a synthetic polyisoprene rubber having a cis-1,4-bond content of more than 99.0% and a 3,4-bond content of more than 0.5% and (B) a natural rubber, wherein a ratio by mass of (A) the synthetic polyisoprene rubber to a total of (A) the synthetic polyisoprene rubber and (B) the natural rubber is 5-60 mass%.

Experimental Procedure

(Synthesis of Polyisoprene rubber C)

A polyisoprene rubber is synthesized in the same manner as in the Production Example 1 of Polyisoprene disclosed in paragraph [0028] in the specification of the present application except that a polymerization temperature is 0°C. As a result of the synthesis, 39.5 g of a polyisoprene rubber C is obtained in a yield of 93%. In the polyisoprene rubber C, the number average molecular weight (Mn) by a GPC is 947,200 and Mw/Mn is 1.99. As the micro-structure is determined from an integration ratio of 15.5-16.5 ppm (1,4-trans unit),

18.0-19.0ppm (3,4-unit) and 23.0-24.0ppm (1,4-cis unit), the cis-1,4-bond content is 99.3%, the trans-1,4-bond content is 0% and the 3,4-bond content is 0.7%.

(Additional comparative examples C, D and E)

<Preparation of Rubber composition>

By using the above described polyisoprene rubber C, a rubber composition is prepared according to a compounding recipe shown in the following Table B.

<Evaluation of properties of rubber composition>

With respect to the resulting rubber compositions, the processability, wear resistance and durability of the rubber composition are evaluated according to the methods described in paragraphs [0032]-[0034] in the specification of the present application. Results obtained from these experiments and the results described in the present specification are summarized in the following Table B.

Table B

	Example 1	Additional Comparative Example 1	Example 2	Additional Comparative Example 2	Comparative Example 3	Additional Comparative Example 3	Comparative Example 4	Comparative Example 5	Comparative Example 6
Natural rubber (RSS#3)	90	90	75	75	50	50	50	50	100
Polyisoprene rubber A *1	10	-	25	-	50	-	-	-	-
Polyisoprene rubber B *2	-	10	-	25	-	-	50	-	-
Polyisoprene rubber C *3	-	10	-	25	-	-	50	-	-
Carbon black *4	50	50	50	50	50	50	50	50	50
Formulation	parts by mass	2	2	2	2	2	2	2	2
Stearic acid	1	1	1	1	1	1	1	1	1
Antioxidant 6C *5	3	3	3	3	3	3	3	3	3
Zinc oxide									
Vulcanization accelerator DZ *6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Sulfur	1	1	1	1	1	1	1	1	1
Processability	112	109	108	121	113	109	138	121	115
Wear resistance	101	100	99	99	97	97	99	95	93
Evaluation	Index	97	90	87	94	87	84	90	82
	Durability								

*1 Produced by the Production Example 1 of Polysoprene described in paragraph [0028] in the specification of the present application, cis-1,4-bond content=99.6%, 3,4-bond content=0.4%.

*2 IR2200, made by TSR Corporation, cis-1,4-bond content=98.0%, 3,4-bond content=2.0%.

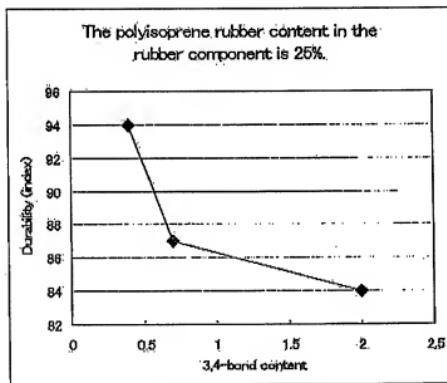
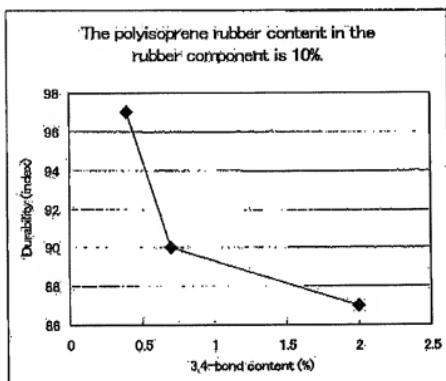
*3 The polyisoprene rubber synthesized as described above, cis-1,4-bond content=99.3%, 3,4-bond content=0.7%.

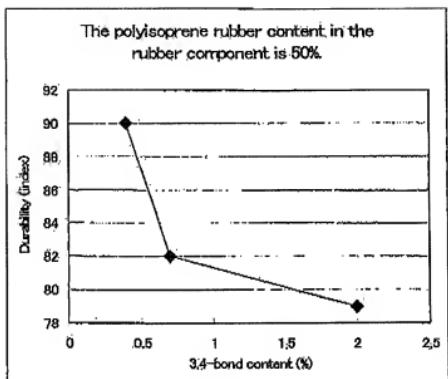
*4 N339, made by Tokai Carbon Co., Ltd. NaSA=93m²/g.

*5 N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine, made by Ohuchi Shinkou Kagaku Co., Ltd., Nocrac 6C.

*6 N,N'-dicyclohexyl-2-benzothiazolyl sulfenamide, made by Ohuchi Shinkou Kagaku Co., Ltd. Noctel DZ.

Further, the results of the durability of each rubber composition are shown in the following graphs.





(Summary)

As seen from the above results of the additional comparative examples C, D and E, when the 3,4-bond content of the polyisoprene rubber exceeds 0.5%, the durability of the rubber composition is notably deteriorated.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 1-12-2019 Declarant: Eiji Suzuki